



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

NATIONAL EXPOSURE RESEARCH LABORATORY
HUMAN EXPOSURE & ATMOSPHERIC SCIENCES DIVISION (MD-46)
Research Triangle Park, NC 27711
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Office of
Research and Development

LIST OF DESIGNATED REFERENCE AND EQUIVALENT METHODS

Issue Date: March 24, 2000

(www.epa.gov/ttn/amtic/criteria.html)

These methods for measuring ambient concentrations of specified air pollutants have been designated as "reference methods" or "equivalent methods" in accordance with Title 40, Part 53 of the Code of Federal Regulations (40 CFR Part 53). Subject to any limitations (e.g., operating range or temperature range) specified in the applicable designation, each method is acceptable for use in state or local air quality surveillance systems under 40 CFR Part 58 unless the applicable designation is subsequently canceled. Automated methods for pollutants other than PM₁₀ are acceptable for use only at shelter temperatures between 20EC and 30EC and line voltages between 105 and 125 volts unless wider limits are specified in the method description.

Prospective users of the methods listed should note (1) that each method must be used in strict accordance with its associated operation or instruction manual and with applicable quality assurance procedures, and (2) that modification of a method by its vendor or user may cause the pertinent designation to be inapplicable to the method as modified. (See Section 2.8 of Appendix C, 40 CFR Part 58 for approval of modifications to any of these methods by users.)

Further information concerning particular designations may be found in the *Federal Register* notice cited for each method or by writing to the National Exposure Research Laboratory, Human Exposure and Atmospheric Sciences Division (MD-46), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711. Technical information concerning the methods should be obtained by contacting the source listed for each method. Source addresses are listed at the end of the listing of methods, except for the addresses for lead method sources, which are given with the method. New analyzers or PM₁₀ samplers sold as reference or equivalent methods must carry a label or sticker identifying them as designated methods. For analyzers or PM₁₀ samplers sold prior to the designation of a method with the same or similar model number, the model number does not necessarily identify an analyzer or sampler as a designated method. Consult the manufacturer or seller to determine if a previously sold analyzer or sampler can be considered a designated method or if it can be upgraded to designation status. Analyzer users who experience operational or other difficulties with a designated analyzer or sampler and are unable to resolve the problem directly with the instrument manufacturer may contact EPA (preferably in writing) at the above address for assistance.

This list will be revised as necessary to reflect any new designations or any cancellation of a designation currently in effect. The most current revision of the list will be available for inspection at EPA's Regional Offices, and copies may be obtained by writing to the National Exposure Research Laboratory at the address specified above.

Most Recent Designations

DKK Corp. Model GUX-113E U. V. Ozone Analyzer	March 2, 2000
DKK Corp. Model GFS-112E U.V. Fluorescence SO ₂ Analyzer	January 18, 2000
Andersen RAAS10-100, RAAS10-200, RAAS10-300 PM ₁₀ Samplers	June 23, 1999
Rupprecht & Patashnick Partisol® Model 2000 PM-2.5 Audit Sampler	April 19, 1999
Andersen Model RAAS2.5-200 PM2.5 Audit Air Sampler	March 11, 1999

PARTICULATE MATTER - TSP**Reference Method for TSP***Manual Reference Method: 40 CFR Part 50, Appendix B*

Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method)

[Federal Register: Vol 47, page 54912, 12/06/82 and Vol 48, page 17355, 04/22/83]

PARTICULATE MATTER - PM₁₀**Andersen Model RAAS10-100 PM₁₀ Single Channel PM₁₀ Sampler***Manual Reference Method: RFPS-0699-130*

"Andersen Instruments, Incorporated Model RAAS10-100 Single Channel Reference Method PM₁₀ Sampler," with RAAS-10 PM₁₀ inlet, configured as a PM₁₀ reference method, and operated for 24-hour continuous sample periods at a flow rate of 16.67 liters/minute, and in accordance with the Model RAAS105-100 Operator's Manual and with the requirements and sample collection filters specified in 40 CFR Part 50, Appendix J or Appendix M.

*[Federal Register: Vol 64, page 33481, 06/23/99]***Andersen Model RAAS10-200 PM₁₀ Single Channel PM₁₀ Audit Sampler***Manual Reference Method: RFPS-0699-131*

"Andersen Instruments, Incorporated Model RAAS10-200 Single Channel Reference Method PM₁₀ Audit Sampler," with RAAS-10 PM₁₀ inlet, configured as a PM₁₀ reference method, and operated for 24-hour continuous sample periods at a flow rate of 16.67 liters/minute, and in accordance with the Model RAAS105-200 Operator's Manual and with the requirements and sample collection filters specified in 40 CFR Part 50, Appendix J or Appendix M.

*[Federal Register: Vol 64, page 33481, 06/23/99]***Andersen Model RAAS10-300 PM₁₀ Multi Channel PM₁₀ Sampler***Manual Reference Method: RFPS-0699-132*

"Andersen Instruments, Incorporated Model RAAS10-300 Multi Channel Sequential Reference Method PM₁₀ Sampler," with RAAS-10 PM₁₀ inlet, configured as a PM₁₀ reference method, and operated for 24-hour continuous sample periods at a flow rate of 16.67 liters/minute, and in accordance with the Model RAAS105-300 Operator's Manual and with the requirements and sample collection filters specified in 40 CFR Part 50, Appendix J or Appendix M.

*[Federal Register: Vol 64, page 33481, 06/23/99]***BGI Incorporated Model PQ100 Air Sampler***Manual Reference Method: RFPS-1298-124*

"BGI Incorporated Model PQ100 Air Sampler" with BGI 16.7 Inlet Kit or the louvered inlet specified in 40 CFR 50 Appendix L, Figs. L-2 thru L-19, configured as a PM₁₀ reference method, for 24-hour continuous sample periods at a flow rate of 16.7 liters/minute, operated in accordance with the Model PQ100 Instruction Manual and with the requirements specified in 40 CFR Part 50, Appendix J or Appendix M, using either the original or the newer PQ200-type filter cassettes, and with or without the optional Solar Panel Power Supply.

*[Federal Register: Vol 63, page 69625, 12/17/98]***BGI Incorporated Model PQ200 Air Sampler***Manual Reference Method: RFPS-1298-125*

"BGI Incorporated Model PQ200 Air Sampler" with "flat plate" PM₁₀ inlet or the louvered inlet specified in 40 CFR 50 Appendix L, Figs. L-2 thru L-19, configured as a PM₁₀ reference method, and operated for 24-hour continuous sample periods in accordance with the Model PQ200 Instruction Manual and with the requirements specified in 40 CFR Part 50, Appendix J or Appendix M, and with or without the optional Solar Panel Power Supply.

*[Federal Register: Vol 63, page 69625, 12/17/98]***Graseby Andersen/GMW Model 1200 High-Volume Air Sampler***Manual Reference Method: RFPS-1287-063*

Sierra-Andersen or General Metal Works Model 1200 PM₁₀ High-Volume Air Sampler System," consisting of a Sierra-Andersen or General Metal Works Model 1200 PM₁₀ Size-Selective Inlet and any of the high-volume air samplers identified as SAUV-10H, SAUV-11H, GMW-IP-10, GMW-IP-10-70, GMW-IP-10-801, or GMW-IP-10-8000, which include the following components: Anodized aluminum high-volume shelter with either acrylonitrile butadiene styrene plastic filter holder and motor/blower housing or stainless steel filter holder and phenolic plastic motor/blower housing; 0.6 hp motor/blower; pressure transducer flow recorder; either an electronic mass flow controller or a volumetric flow controller; either a digital timer/programmer, seven-day mechanical timer, six-day timer/programmer, or solid-state timer/programmer; elapsed time indicator; and filter cartridge.

[Federal Register: Vol 52, page 45684, 12/01/87 and Vol 53, page 1062, 01/15/88]

Graseby Andersen/GMW Model 321-B High-Volume Air Sampler*Manual Reference Method: RFPS-1287-064*

"Sierra-Andersen or General Metal Works Model 321-B PM₁₀ High-Volume Air Sampler System," consisting of a Sierra-Andersen or General Metal Works Model 321-B PM₁₀ Size-Selective Inlet and any of the high-volume air samplers identified as SAUV-10H, SAUV-11H, GMW-IP-10, GMW-IP-10-70, GMW-IP-10-801, or GMW-IP-10-8000, which include the following components: Anodized aluminum high-volume shelter with either acrylonitrile butadiene styrene plastic filter holder and motor/blower housing or stainless steel filter holder and phenolic plastic motor/blower housing; 0.6 hp motor/blower; pressure transducer flow recorder; either an electronic mass flow controller or a volumetric flow controller; either a digital timer/programmer, seven-day mechanical timer, six-day timer/programmer, or solid-state timer/programmer; elapsed time indicator; and filter cartridge.

[Federal Register: Vol 52, page 45684, 12/01/87 and Vol 53, page 1062, 01/15/88]

Graseby Andersen/GMW Model 321-C High-Volume Air Sampler*Manual Reference Method: RFPS-1287-065*

"Sierra-Andersen or General Metal Works Model 321-C PM₁₀ High-Volume Air Sampler System," consisting of a Sierra-Andersen or General Metal Works Model 321-C PM₁₀ or Size-Selective Inlet and any of the high-volume air samplers identified as SAUV-10H, SAUV-11H, GMW-IP-10, GMW-IP-10-70, GMW-IP-10-801, or GMW-IP-10-8000, which include the following components: Anodized aluminum high-volume shelter with either acrylonitrile butadiene styrene plastic filter holder and motor/blower housing or stainless steel filter holder and phenolic plastic motor/blower housing; 0.6 hp motor/blower; pressure transducer flow recorder; either an electronic mass flow controller or a volumetric flow controller; either a digital timer/programmer, seven-day mechanical timer, six-day timer/programmer, or solid-state timer/programmer; elapsed time indicator; and filter cartridge.

[Federal Register: Vol 52, page 45684, 12/01/87 and Vol 53, page 1062, 01/15/88]

Graseby Andersen/GMW Models SA241 and SA241M Dichotomous Sampler*Manual Reference Method: RFPS-0789-073*

"Sierra-Andersen Models SA241 and SA241M or General Metal Works Models G241 and G241M PM₁₀ Dichotomous Samplers," consisting of the following components: Sampling Module with SA246b or G246b 10 Fm inlet, 2.5 Fm virtual impactor assembly, 37 mm coarse and fine particulate filter holders, and tripod mount; Control Module with diaphragm vacuum pump, pneumatic constant flow controller, total and coarse flow rotameters and vacuum gauges, pressure switch (optional), 24-hour flow/event recorder, digital timer/programmer or 7-day skip timer, and elapsed time indicator.

[Federal Register: Vol 54, page 31247, 07/27/89]

Graseby Andersen/GMW Model FH62I-N Beta Monitor*Automated Equivalent Method: EQPM-0990-076*

"Andersen Instruments Model FH62I-N PM₁₀ Beta Attenuation Monitor," consisting of the following components: FH101 Vacuum Pump Assembly; FH102 Accessory Kit; FH107 Roof Flange Kit; FH125 Zero and Span PM₁₀ Mass Foil Calibration Kit; FH62I Beta Attenuation 19-inch Control Module; SA246b PM₁₀ Inlet (16.7 liter/min); operated for 24-hour average measurements, with an observing time of 60 minutes, the calibration factor set to 2400, a glass fiber filter tape, an automatic filter advance after each 24-hour sample period, and with or without either of the following options: FH0P1 Indoor Cabinet; FH0P2 Outdoor Shelter Assembly.

[Federal Register: Vol 55, page 38387, 09/18/90]

Met One or Sibata Models BAM/GBAM 1020, BAM/GBAM 1020-1*Automated Equivalent Method: EQPM-0798-122*

"Met One Instruments or Sibata Scientific Technology Models BAM 1020, GBAM 1020, BAM 1020-1, and GBAM 1020-1 PM₁₀ Beta Attenuation Monitor," including the BX-802 sampling inlet, operated for 24-hour average measurements, with a filter change frequency of one hour, with glass fiber filter tape, and with or without any of the following options: BX-823, tube extension; BX-825, heater kit; BX-826, 230 Vac heater kit; BX-828, roof tripod; BX-902, exterior enclosure; BX-903, exterior enclosure with temperature control; BX-961, mass flow controller; BX-967, internal calibration device

[Federal Register: Vol 63, page 41253, 08/03/98]

Oregon DEQ Medium Volume PM₁₀ Sampler*Manual Reference Method: RFPS-0389-071*

"Oregon DEQ Medium Volume PM₁₀ Sampler." NOTE: This method is not now commercially available.

[Federal Register: Vol 54, page 12273, 03/24/89]

Rupprecht & Patashnick TEOM Series 1400/1400a PM₁₀ Monitors*Automated Equivalent Method: EQPM-1090-079*

"Rupprecht & Patashnick TEOM Series 1400 and Series 1400a PM-10 Monitors" (including serial number prefixes 1400, 140A, 140AA, 140AB, 140AT, and 140UP), consisting of the following components: TEOM Sensor Unit; TEOM Control Unit; Flow Splitter (3 liter/min sample flow); Teflon-Coated Glass Fiber Filter Cartridges; Rupprecht & Patashnick PM-10 Inlet (part number 57-00596), Sierra-Andersen Model 246b PM-10 Inlet (16.7 liter/min) or louvered inlet specified in 40 CFR 50 Appendix L, Figs. L-2 thru L-19; operated for 24-hour average measurements, with the total mass averaging time set at 300 seconds, the mass rate/mass concentration averaging time set at 300 seconds, the gate time set at 2 seconds, and with or without any of the following options: Tripod; Outdoor Enclosure; Automatic Cartridge Collection Unit (Series 1400a only); Flow Splitter Adapter (for 1 or 2 liter/min sample flow).

[Federal Register: Vol 55, page 43406, 10/29/90]

Rupprecht & Patashnick Partisol Model 2000 Air Sampler*Manual Reference Method: RFPS-0694-098*

"Rupprecht & Patashnick Partisol Model 2000 Air Sampler," consisting of a Hub Unit and 0, 1, 2, or 3 Satellite Units, with each sampling station used for PM₁₀ measurements equipped with a Rupprecht & Patashnick PM-10 inlet and operated for continuous 24-hour periods using the Basic, Manual, Time, Analog Input, or Serial Input programming modes, and with or without any of the following options: PM_{2.5}-style filter cassette holder; louvered inlet specified in 40 CFR 50 Appendix L, Figs. L-2 thru L-19 in lieu of standard

inlet; 57-002320 Stand for Hub or Satellite; 59-002542 Advanced EPROM; 10-001403 Large Pump (1/4 hp); 120 VAC. Hardware for Indoor Installation consists of: 51-002638-xxxx Temperature Sensor (Extended Length); 55-001289 Roof Flange (1 1/4"); 57-000604 Support Tripod for Inlet; 57-002526-0001 Sample Tube Extension (1 m); 57-002526-0002 Sample Tube Extension (2 m). Hardware for Outdoor Installation in Extreme Cold Environments consists of: 10-002645 Insulating Jacket for Hub Unit.

[Federal Register: Vol 59, page 35338, 07/11/94]

Rupprecht and Patashnick Co. Partisol®-FRM Model 2000 PM₁₀ Air Sampler *Manual Reference Method: RFPS-1298-126*
 "Rupprecht and Patashnick Company Partisol®-FRM Model 2000 PM₁₀ Air Sampler" with PM₁₀ inlet or louvered inlet specified in 40 CFR 50 Appendix L, Figs. L-2 thru L-19, configured as a PM₁₀ reference method, and operated for 24-hour continuous sample periods in accordance with the Model 2000 Instruction Manual and with the requirements specified in 40 CFR Part 50, Appendix J or Appendix M.
 [Federal Register: Vol 63, page 69625, 12/17/98]

Rupprecht and Patashnick Partisol®-Plus Model 2025 PM₁₀ Seq. Air Sampler *Manual Reference Method: RFPS-1298-127*
 "Rupprecht and Patashnick Company Partisol®-Plus Model 2025 PM₁₀ Sequential Air Sampler" with PM₁₀ inlet or louvered inlet specified in 40 CFR 50 Appendix L, Figs. L-2 thru L-19, configured as a PM₁₀ reference method, and operated for 24-hour continuous sample periods in accordance with the Model 2025 Instruction Manual and with the requirements specified in 40 CFR Part 50, Appendix J or Appendix M.
 [Federal Register: Vol 63, page 69625, 12/17/98]

Wedding & Associates' or Thermo Environmental Instruments Inc. Model 600 PM₁₀ High-Volume Sampler *Manual Reference Method: RFPS-1087-062*
 "Wedding & Associates' or Thermo Environmental Instruments, Inc. Model 600 PM₁₀ Critical Flow High-Volume Sampler," consisting of the following W&A/TEII components: PM₁₀ Inlet; Critical Flow Device; Anodized Aluminum Shelter; Blower Motor Assembly for 115, 220 or 240 VAC and 50/60 Hz; Mechanical Timer; Elapsed Time Indicator; and Filter Cartridge/Cassette, and with or without the following options: Digital Timer, 6 or 7 Day Timer, and 1 or 7 Day Pressure Recorder.
 [Federal Register: Vol 52, page 37366, 10/06/87]

Wedding & Associates' or Thermo Environmental Instruments Inc. Model 650 PM₁₀ Beta Gauge *Automated Equivalent Method: EQPM-0391-081*
 "Wedding & Associates' or Thermo Environmental Instruments, Inc. Model 650 PM₁₀ Beta Gauge Automated Particle Sampler," consisting of the following W&A/TEII components: Particle Sampling Module, PM₁₀ Inlet (18.9 liter/min), Inlet Tube and Support Ring, Vacuum Pump (115, 220 or 240 VAC and 50/60 Hz); and operated for 24-hour average measurements with glass fiber filter tape.
 [Federal Register: Vol 56, page 9216, 03/05/91]

PARTICULATE MATTER - PM_{2.5}

Andersen Model RAAS2.5-200 PM_{2.5} Ambient Audit Air Sampler *Manual Reference Method: RFPS-0299-128*
 "Andersen Instruments, Incorporated Model RAAS2.5-200 PM_{2.5} Audit Sampler," configured as a PM_{2.5} reference method and operated with software (firmware) version 4B or 5.0.1, for 24-hour continuous sample periods at a flow rate of 16.67 liters/minute, and in accordance with the Model RAAS2.5-200 Operator's Manual and with the requirements and sample collection filters specified in 40 CFR Part 50, Appendix L.
 [Federal Register: Vol 64, page 12167, 03/11/99]

BGI Inc. Models PQ200 and PQ200A PM_{2.5} Ambient Fine Particle Sampler *Manual Reference Method: RFPS-0498-116*
 "BGI Incorporated Models PQ200 and PQ200A PM_{2.5} Ambient Fine Particle Sampler," operated with firmware version 3.88 or 3.89R, for 24-hour continuous sample periods, in accordance with the Model PQ200/PQ200A Instruction Manual and with the requirements and sample collection filters specified in 40 CFR Part 50, Appendix L, and with or without the optional Solar Power Supply or the optional dual-filter cassette (P/N F-21/6) and associated lower impactor housing (P/N B2027), where the upper filter is used for PM_{2.5}. The Model PQ200A is described as a portable audit sampler and includes a set of three carrying cases.
 [Federal Register: Vol 63, page 18911, 04/16/98]

Graseby Andersen Model RAAS2.5-100 PM2.5 Ambient Air Sampler*Manual Reference Method: RFPS-0598-119*

"Graseby Andersen Model RAAS2.5-100 PM2.5 Ambient Air Sampler," operated with software version 4B or 5.0.1 configured for "Single 2.5" operation, for 24-hour continuous sample periods at a flow rate of 16.67 liters/minute, and in accordance with the Model RAAS2.5-100 Operator's Manual and with the requirements and sample collection filters specified in 40 CFR Part 50, Appendix L.

[Federal Register: Vol 63, page 31991, 06/11/98]

Graseby Andersen Model RAAS2.5-300 PM2.5 Sequential Ambient Air Sampler*Manual Reference Method: RFPS-0598-120*

"Graseby Andersen Model RAAS2.5-300 PM2.5 Sequential Ambient Air Sampler," operated with software version 4B or 5.0.1 configured for "Multi 2.5" operation, for 24-hour continuous sample periods at a flow rate of 16.67 liters/minute, and in accordance with the Model RAAS2.5-300 Operator's Manual and with the requirements and sample collection filters specified in 40 CFR Part 50, Appendix L.

[Federal Register: Vol 63, page 31991, 06/11/98]

Rupprecht & Patashnick Partisol®-FRM Model 2000 Air Sampler*Manual Reference Method: RFPS-0498-117*

"Rupprecht & Patashnick Company, Incorporated Partisol®-FRM Model 2000 PM-2.5 Air Sampler," operated with software versions 1.102 - 1.202, with either R&P-specified machined or molded filter cassettes, with or without the optional insulating jacket for cold weather operation, for 24-hour continuous sample periods, in accordance with the Model 2000 Instruction Manual and with the requirements and sample collection filters specified in 40 CFR Part 50, Appendix L.

[Federal Register: Vol 63, page 18911, 04/16/98]

Rupprecht & Patashnick Partisol® Model 2000 PM-2.5 Audit Sampler*Manual Reference Method: RFPS-0499-129*

"Rupprecht & Patashnick Company, Inc. Partisol® Model 2000 PM-2.5 Audit Sampler," configured as a PM_{2.5} reference method and operated with software (firmware) version 1.2 - 1.202, for 24-hour continuous sample periods at a flow rate of 16.67 liters/minute, in accordance with the Partisol® Model 2000 Operating Manual and with the requirements and sample collection filters specified in 40 CFR Part 50, Appendix L.

[Federal Register: Vol 64, page 19153, 04/19/99]

Rupprecht & Patashnick Partisol®-Plus Model 2025 Sequential Air Sampler*Manual Reference Method: RFPS-0498-118*

"Rupprecht & Patashnick Company, Incorporated Partisol®-Plus Model 2025 PM-2.5 Sequential Air Sampler," operated with any software version 1.003 through 1.400, with either R&P-specified machined or molded filter cassettes, for 24-hour continuous sample periods, in accordance with the Model 2025 Instruction Manual and with the requirements and sample collection filters specified in 40 CFR Part 50, Appendix L.

[Federal Register: Vol 63, page 18911, 04/16/98]

Thermo Environmental Instruments, Incorporated Model 605 "CAPS" Sampler*Manual Reference Method: RFPS-1098-123*

"Thermo Environmental Instruments, Incorporated Model 605 "CAPS" Computer Assisted Particle Sampler," configured as a PM2.5 reference method and operated with software version 1.02A, for 24-hour continuous sample periods, in accordance with the Model 605 Instruction Manual and with the requirements and sample collection filters specified in 40 CFR Part 50, Appendix L.

[Federal Register: Vol 63, page 58036, 10/29/98]

NOTES

¹ Users should be aware that designation of this analyzer for operation on ranges less than the range specified in the performance specifications for this analyzer (40 CFR 53, Subpart B) is based on meeting the same absolute performance specifications required for the specified range. Thus, designation of these lower ranges does not imply commensurably better performance than that obtained on the specified range.

² This analyzer is approved for use, with proper factory configuration, on either 50 or 60 Hertz line frequency and nominal power line voltages of 115 Vac and 220 Vac.

Sources or Contacts for Designated Reference and Equivalent Methods

ABB Process Analytics
P.O. Box 831
Lewisburg, WV 24901
(304) 647-4358

Advanced Pollution
Instrumentation, Inc.
6565 Nancy Ridge Drive
San Diego, CA 92121-2251
(619) 657-9800

Andersen Instruments
500 Technology Court
Smyrna, GA 30082-9211
(800) 241-6898

ASARCO Incorporated
3422 South 700 West
Salt Lake City, UT 84119
(801) 262-2459

Beckman Instruments, Inc.
Process Instruments Division
2500 Harbor Blvd.
Fullerton, CA 92634
(714) 871-4848

Bendix
[Refer to ABB Process Analytics]

BGI Incorporated
58 Guinan Street
Waltham, MA 02154

Columbia Scientific Industries
11950 Jollyville Road
Austin, TX 78759
(800) 531-5003

Combustion Engineering
[Refer to ABB Process Analytics]

Dasibi Environmental Corp.
506 Paula Avenue
Glendale, CA 91201
(818) 247-7601

DKK Corporation
4-13-14 Kichijoji Kitamachi,
Musashino-shi
Tokyo, 180, Japan

Environnement S.A
111, bd Robespierre
78300 Poissy, France
Instruments also available from:
Altech/Environnement U.S.A.
2623 Kaneville Court
Geneva, IL 60134
(630) 262- 4400
rbrown@altechusa.com

Envionics, Inc.
69 Industrial Park Rd. E.
Tolland, CT 06084-2805
(203) 429-0077

Graseby GMW
[Refer to Andersen Instruments]

Horiba Instruments Incorporated
17671 Armstrong Avenue
Irvine, CA 92714
(800) 446-7422

Lear Siegler
[Refer to Monitor Labs, Inc.]

Commonwealth of Massachusetts
Department of Environmental
Quality Engineering
Tewksbury, MA 01876

Met One Instruments, Inc.
1600 Washington Blvd.
Grants Pass, OR 97526
(541) 471-7111
metone@metone.com

McMillan
[Refer to Columbia Scientific Industries]

Mine Safety Appliances
600 Penn Center Blvd.
Pittsburgh, PA 15235-5810
(412) 273-5101

Monitor Labs, Inc.
74 Inverness Drive
Englewood, CO 80112-5189
(800) 422-1499

Opsis AB, Furulund, Sweden
Instruments also available from:
Opsis, Inc.
146-148 Sound Beach Avenue
Old Greenwich, CT 06870
(203) 698-1810

State of Oregon
Department of Environmental Quality
Air Quality Division
811 S.W. Sixth Avenue
Portland, OR 97204

PCI Ozone Corp.
One Fairfield Crescent
West Caldwell, NJ 07006
(201) 575-7052

Phillips Electronic Instruments, Inc.
85 McKee Drive
Mahwah, NJ 07430

Rupprecht & Patashnik Co., Inc.
25 Corporate Circle
Albany, NY 12203
(518) 452-0065

Sibata Scientific Technology, Ltd.
1-25, 3-chome
Ikenohata, Taito-ku
Tokyo 110, Japan
81-3(3822)2272
TTani@email.msn.com

Thermo Environmental Instruments,
Inc.
8 West Forge Parkway
Franklin, MA 02038
(508) 520-0430

U.S. EPA
National Exposure Research Laboratory
Human Exposure & Atmospheric
Sciences Division
MD-46
Research Triangle Park, NC 27711
(919) 541- 2622

Wedding and Associates, Inc.
[Refer to Thermo Environmental
Instruments, Inc.]

U.S. EPA REFERENCE & EQUIVALENT METHODS FOR AMBIENT AIR

March 17, 2000

<u>Method</u>	<u>Designation Number</u>	<u>Method Code</u>	<u>Method</u>	<u>Designation Number</u>	<u>Method Code</u>
<u>SO₂ Manual Methods</u>					
Reference method (pararosaniline)	--	097	Horiba APNA-360	RFNA-0196-111	111
Technicon I (pararosaniline)	EQS-0775-001	097	Lear Siegler or Monitor Labs ML9841, ML9841A, Monitor Labs ML9841B, Wedding 1030	RFNA-1292-090	090
Technicon II (pararosaniline)	EQS-0775-002	097	Meloy NA530R	RFNA-1078-031	031
			Monitor Labs 8440E	RFNA-0677-021	021
<u>SO₂ Analyzers</u>			Monitor Labs or Lear Siegler 8840	RFNA-0280-042	042
Advanced Pollution Instr. 100	EQSA-0990-077	077	Monitor Labs or Lear Siegler 8841	RFNA-0991-083	083
Advanced Pollution Instr. 100A	EQSA-0495-100	100	Opsis AR 500, System 300 (open path)	EQNA-0495-102	102
Asarco 500	EQSA-0877-024	024	Philips PW9762/02	RFNA-0879-040	040
Beckman 953	EQSA-0678-029	029	Thermo Electron or Thermo Environmental Instruments 14B/E	RFNA-0179-035	035
Bendix 8303	EQSA-1078-030	030	Thermo Electron or Thermo Environmental Instruments 14D/E	RFNA-0279-037	037
Columbia Scientific Industries 5700	EQSA-0494-095	095	Thermo Environmental Instr. 42, 42C	RFNA-1289-074	074
Dasibi 4108	EQSA-1086-061	061			
DKK Corp. Model GFS-32	EQSA-0701-115	115	<u>Pb Manual Methods</u>		
DKK Corp. Model GFS-112E	EQSA-0100-133	133	Reference method (hi-vol/AA spect.)	--	803
Environnement S.A. AF21M	EQSA-0292-084	084	Hi-vol/AA spect. (alt. extr.)	EQL-0380-043	043
Horiba Model APSA-360/APSA-360ACE	EQSA-0197-114	114	Hi-vol/Energy-disp XRF (TX ACB)	EQL-0783-058	058
Lear Siegler AM2020	EQSA-1280-049	049	Hi-vol/Energy-disp XRF (NEA)	EQL-0589-072	072
Lear Siegler SM1000	EQSA-1275-005	005	Hi-vol/Flameless AA (EMSL/EPA)	EQL-0380-044	044
Lear Siegler or Monitor Labs ML9850, Monitor Labs ML9850B, Wedding 1040	EQSA-0193-092	092	Hi-vol/Flameless AA (Houston)	EQL-0895-107	107
Meloy SA185-2A	EQSA-1275-006	006	Hi-vol/Flameless AA (Omaha)	EQL-0785-059	059
Meloy SA285E	EQSA-1078-032	032	Hi-vol/ICAP spect. (Doe Run Co.)	EQL-0196-113	113
Meloy SA700	EQSA-0580-046	046	Hi-vol/ICAP spect. (EMSL/EPA)	EQL-0380-045	045
Monitor Labs 8450	EQSA-0876-013	513	Hi-vol/ICAP spect. (Illinois)	EQL-1193-094	094
Monitor Labs or Lear Siegler 8850	EQSA-0779-039	039	Hi-vol/ICAP spect. (Kansas)	EQL-0592-085	085
Monitor Labs or Lear Siegler 8850S	EQSA-0390-075	075	Hi-vol/ICAP spect. (Montana)	EQL-0483-057	057
Opsis AR 500, System 300 (open path)	EQSA-0495-101	101	Hi-vol/ICAP spect. (NE&T)	EQL-1188-069	069
Philips PW9700	EQSA-0876-011	511	Hi-vol/ICAP spect. (New Hampshire)	EQL-1290-080	080
Philips PW9755	EQSA-0676-010	010	Hi-vol/ICAP spect. (Pennsylvania)	EQL-0592-086	086
Thermo Electron 43	EQSA-0276-009	009	Hi-vol/ICAP spect. (Pima Co., AZ)	EQL-0995-109	109
Thermo Electron 43A or Thermo Environmental Instruments 43B, 43C	EQSA-0486-060	060	Hi-vol/ICAP spect. (Pima Co., AZ)	EQL-0995-110	110
			Hi-vol/ICAP spect. (Rhode Island)	EQL-0888-068	068
<u>O₃ Analyzers</u>			Hi-vol/ICAP spect. (Silver Val. Labs)	EQL-1288-070	070
Advanced Pollution Instr. 400/400A	EQOA-0992-087	087	Hi-vol/ICAP spect. (West Virginia)	EQL-0694-096	096
Beckman 950A	RFOA-0577-020	020	Hi-vol/WL-disp. XRF (CA A&IHL)	EQL-0581-052	052
Bendix 8002	RFOA-0176-007	007			
Columbia Scientific Industries 2000	RFOA-0279-036	036	<u>PM₁₀ Samplers</u>		
Dasibi 1003-AH, -PC, -RS	EQOA-0577-019	019	Andersen Instruments, RAAS10-100	RFPS-0699-130	130
Dasibi 1008-AH	EQOA-0383-056	056	Andersen Instruments, RAAS10-200	RFPS-0699-131	131
DKK Corp. Model GUX-113E	EQOA-0200-134	134	Andersen Instruments, RAAS10-300	RFPS-0699-132	132
Envirotronics 300	EQOA-0990-078	078	BGI Model PQ100	RFPS-1298-124	124
Environnement S.A. O ₃ 41M	EQOA-0895-105	105	BGI Model PQ200	RFPS-1298-125	125
Horiba APOA-360	EQOA-0196-112	112	Oregon DEQ Medium volume sampler	RFPS-0389-071	071
Lear Siegler or Monitor Labs ML9810, Monitor Labs ML9810B, Wedding 1010	EQOA-0193-091	091	Ruppel & Patashnick Partisol 2000	RFPS-0694-098	098
McMillan 1100-1	RFOA-1076-014	514	R & P Partisol-FRM Model 2000	RFPS-1298-126	126
McMillan 1100-2	RFOA-1076-015	515	R & P Partisol-Plus Model 2025 Seq.	RFPS-1298-127	127
McMillan 1100-3	RFOA-1076-016	016	Sierra-Andersen/GMW 1200	RFPS-1287-063	063
Meloy OA325-2R	RFOA-1075-003	003	Sierra-Andersen/GMW 321-B	RFPS-1287-064	064
Meloy OA350-2R	RFOA-1075-004	004	Sierra-Andersen/GMW 321-C	RFPS-1287-065	065
Monitor Labs 8410E	RFOA-1176-017	017	Sierra-Andersen/GMW 241 Dichot.	RFPS-0789-073	073
Monitor Labs or Lear Siegler 8810	EQOA-0881-053	053	W&A/Thermo Electron Mod 600 HVL	RFPS-1087-062	062
Opsis AR 500, System 300 (open path)	EQOA-0495-103	103			
PCI Ozone Corp. LC-12	EQOA-0382-055	055	<u>PM₁₀ Analyzers</u>		
Philips PW9771	EQOA-0777-023	023	Andersen Instruments Beta FH62I-N	EQPM-0990-076	076
Thermo Electron or Thermo Environmental Instruments 49, 49C	EQOA-0880-047	047	Met One BAM1020, GBAM1020, BAM1020-1, GBAM1020-1	EQPM-0798-122	122
			R & P TEOM 1400, 1400a	EQPM-1090-079	079
			W&A/Thermo Electron 650 Beta Gauge	EQPM-0391-081	081
<u>CO Analyzers</u>					
Advanced Pollution Instr. 300	RFCA-1093-093	093	<u>PM_{2.5} Samplers</u>		
Beckman 866	RFCA-0876-012	012	Andersen Model RAAS2.5-200 Audit	RFPS-0299-128	128
Bendix 8501-5CA	RFCA-0276-008	008	BGI PQ200/200A	RFPS-0498-116	116
Dasibi 3003	RFCA-0381-051	051	Graseby Andersen RAAS2.5-100	RFPS-0598-119	119
Dasibi 3008	RFCA-0488-067	067	Graseby Andersen RAAS2.5-300	RFPS-0598-120	120
Environnement s.a. CO11M	RFCA-0995-108	108	R & P Partisol-FRM 2000	RFPS-0498-117	117
Horiba AQM-10, -11, -12	RFCA-1278-033	033	R & P Partisol-Plus 2025	RFPS-0498-118	118
Horiba 300E/300SE	RFCA-1180-048	048	Thermo Env'r Model 605 CAPS	RFPS-1098-123	123
Horiba APMA-360	RFCA-0895-106	106	R & P Partisol 2000 Audit	RFPS-0499-129	129
Lear Siegler or Monitor Labs ML9830, Monitor Labs ML9830B, Wedding 1020	RFCA-0992-088	088			
MASS - CO 1 (Massachusetts)	RFCA-1280-050	050	<u>TSP Manual Method</u>		
Monitor Labs 8310	RFCA-0979-041	041	Reference method (high-volume)	--	802
Monitor Labs or Lear Siegler 8830	RFCA-0388-066	066			
MSA 202S	RFCA-0177-018	018			
Thermo Electron or Thermo Environmental Instruments 48, 48C	RFCA-0981-054	054			
<u>NO₂ Manual Methods</u>					
Sodium arsenite (orifice)	EQN-1277-026	084			
Sodium arsenite/Technicon II	EQN-1277-027	084			
TGS-ANSA (orifice)	EQN-1277-028	098			
<u>NO₂ Analyzers</u>					
Advanced Pollution Instr. 200	RFNA-0691-082	082			
Advanced Pollution Instr. 200A	RFNA-1194-099	099			
Beckman 952A	RFNA-0179-034	034			
Bendix 8101-B	RFNA-0479-038	038			
Bendix 8101-C	RFNA-0777-022	022			
Columbia Scientific Indust. 1600, 5600	RFNA-0977-025	025			
Dasibi 2108	RFNA-1192-089	089			
DKK Corp GLN-114E	RFNA-0798-121	121			
Environnement S.A. AC31M	RFNA-0795-104	104			